



YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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Description

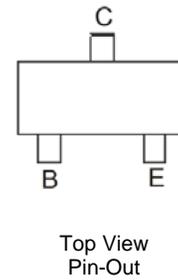
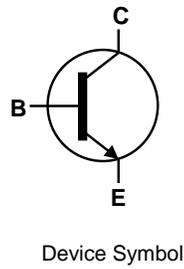
The bipolar junction transistors (BJT) are designed to meet the stringent requirements of automotive applications.

Features

- Ideally Suited for Automatic Insertion
- Complementary PNP Types: NK-AC857BQ – NK-AC857CQ – NK-AC858BQ
- For Switching and AF Amplifier Applications

Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish—Matte Tin Plated Leads, Solderable per
MIL-STD-202, Method 208 ⒺⓅ
- Weight: 0.008 grams (Approximate)



Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Collector-Base Voltage	NK-AC847	V _{CBO}	50	V
	NK-AC848		30	
Collector-Emitter Voltage	NK-AC847	V _{CEO}	45	V
	NK-AC848		30	
Emitter-Base Voltage	NK-AC847	V _{EBO}	6.0	V
	NK-AC848		5.0	
Continuous Collector Current		I _C	100	mA
Peak Collector Current		I _{CM}	200	mA
Peak Emitter Current		I _{EM}	200	mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

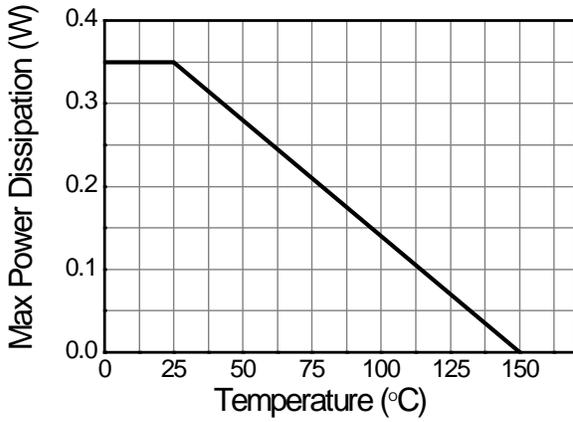
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P _D	310	mW
	(Note 7)		350	
Thermal Resistance, Junction to Ambient	(Note 6)	R _{θJA}	403	°C/W
	(Note 7)		357	
Thermal Resistance, Junction to Leads	(Note 8)	R _{θJL}	350	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-65 to +150	°C

ESD Ratings (Note 9)

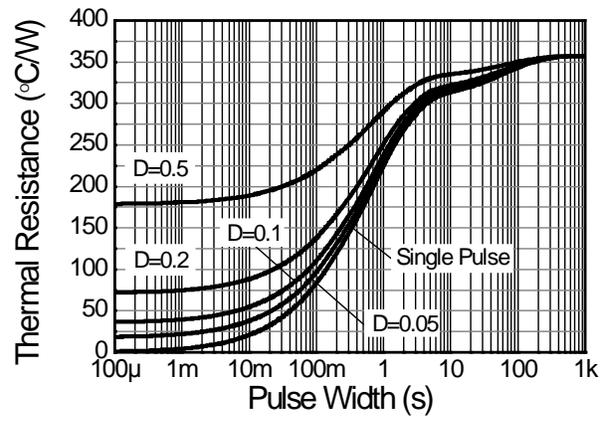
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge—Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge—Machine Model	ESD MM	400	V	C

- Notes:
6. For a device mounted on minimum recommended pad layout 1oz copper that is on a single-sided FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 7. Same as Note 6 except the device is mounted on 15mm × 15mm 1oz copper.
 8. Thermal resistance from junction to solder-point (at the end of the leads).
 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

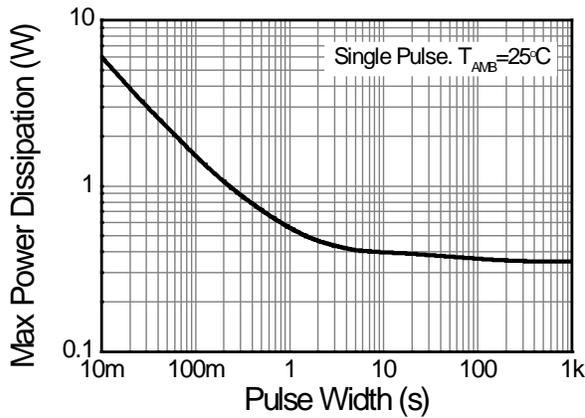
Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	NK-AC847	BV_{CBO}	50	—	—	V	$I_C = 10\mu\text{A}$
	NK-AC848		30	—	—	—	—
Collector-Emitter Breakdown Voltage (Note 10)	NK-AC847	BV_{CEO}	45	—	—	V	$I_C = 10\text{mA}$
	NK-AC848		30	—	—	—	—
Emitter-Base Breakdown Voltage	NK-AC847	BV_{EBO}	6	—	—	V	$I_E = 1\mu\text{A}$
	NK-AC848		5	—	—	—	—
Collector Cutoff Current		I_{CBO}	—	—	15	nA	$V_{CB} = 30\text{V}$
					5	μA	$V_{CB} = 30\text{V}, T_J = +150^\circ\text{C}$
Collector Emitter Cutoff Current		I_{CES}	—	—	15	nA	$V_{CE} = 50\text{V}$
Emitter Base Cutoff Current		I_{EBO}	—	—	100	nA	$V_{EB} = 5\text{V}$
Small Signal Current Gain (Note 10)	NK-AC847BQ/AC848BQ	h_{fe}	—	330	—	—	$I_C = 2.0\text{mA}, V_{CE} = 5\text{V}$ $f = 1.0\text{kHz}$
	NK-AC847CQ			600			
Input Impedance (Note 10)	NK-AC847BQ/AC848BQ	h_{ie}	—	4.5	—	k Ω	
	NK-AC847CQ			8.7			
Output Admittance (Note 10)	NK-AC847BQ/AC848BQ	h_{oe}	—	30	—	μs	
	NK-AC847CQ			60			
Reverse Voltage Transfer Ratio (Note 10)	NK-AC847BQ/AC848BQ	h_{re}	—	2×10^{-4}	—	—	
	NK-AC847CQ			3×10^{-4}			
DC Current Gain (Note 10)	NK-AC847BQ/AC848BQ	h_{FE}	200	290	450	—	
	NK-AC847CQ			420			
Collector-Emitter Saturation Voltage (Note 10)		$V_{CE(SAT)}$	—	90	250	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$
				200	600		$I_C = 100\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Turn-On Voltage (Note 10)		$V_{BE(ON)}$	580	660	700	mV	$I_C = 2\text{mA}, V_{CE} = 5\text{V}$
				—	—		770
Base-Emitter Saturation Voltage (Note 10)		$V_{BE(SAT)}$	—	700	—	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$
				900			$I_C = 100\text{mA}, I_B = 5\text{mA}$
Output Capacitance		C_{OBO}	—	3	—	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$
Transition Frequency		f_T	100	300	—	MHz	$V_{CE} = 5\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$
Noise Figure		NF	—	2	10	dB	$V_{CE} = 5\text{V}, I_C = 200\mu\text{A}$ $R_S = 2\text{k}\Omega, f = 1\text{kHz}$ $\Delta f = 200\text{Hz}$

 Note: 10. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

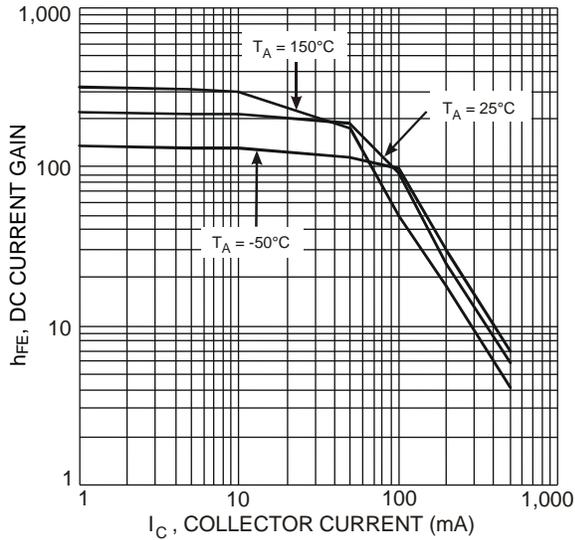


Figure 1 Typical DC Current Gain vs. Collector Current

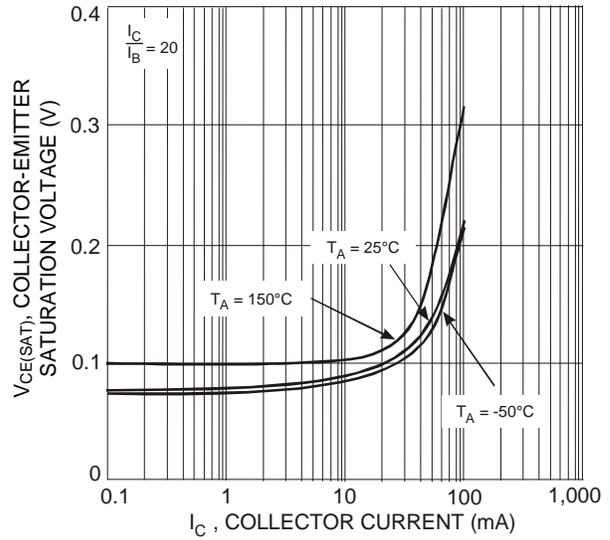


Figure 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

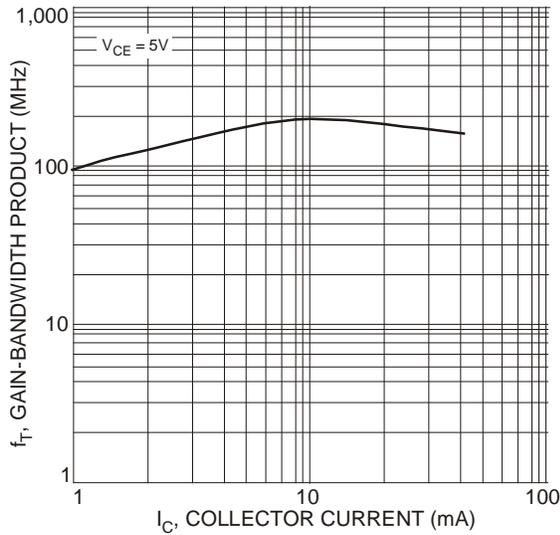


Figure 3 Typical Gain-Bandwidth Product vs. Collector Current

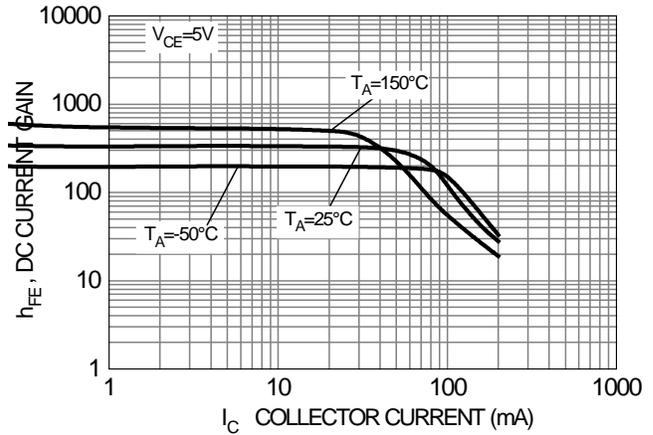


Figure 4 Typical DC Current Gain vs. Collector Current (Band B Group Gain)

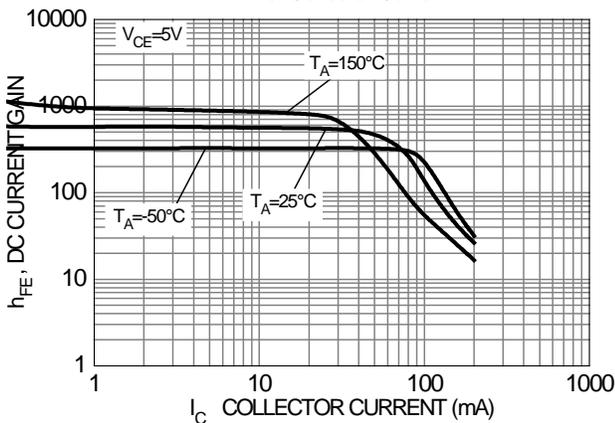
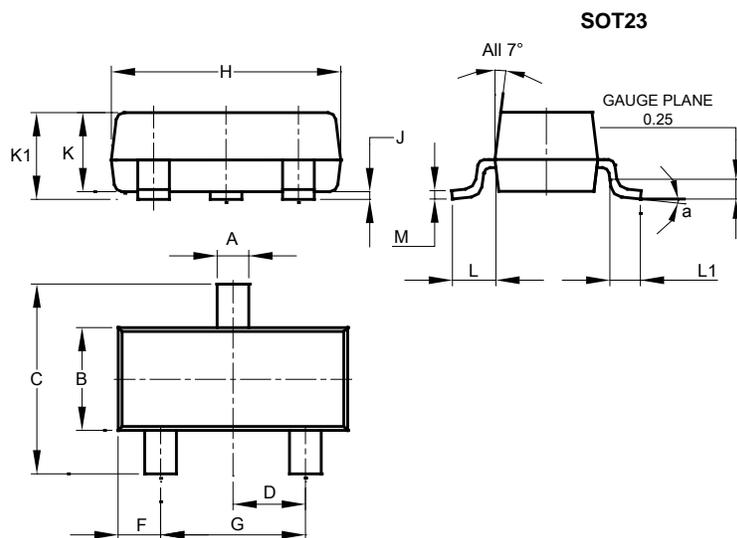


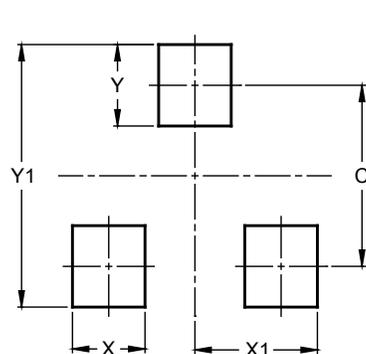
Figure 5 Typical DC Current Gain vs. Collector Current (Band C Group Gain)

Package Outline Dimensions



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9